

## **REMARKS/ARGUMENTS**

Claims 16, 25, 29, 31, 33, 36, and 37 are currently pending in the present application. Claims 16 and 25 are the independent claims.

### **Rejections in view of Cabasso**

In the June 11, 2008 Office Action, claims 16, 25, 29, 31, 33, 36, and 37 were rejected as being anticipated under 35 U.S.C. § 102(b) by Cabasso et al..U.S. Patent No. 5,783,325 ("Cabasso"), or, in the alternative, under 35 U.S.C. § 103(a) for obviousness in view of Cabasso.

Cabasso describes a standard gas diffusion electrode (GDE), in which the substrate is filled with a carbon/polymer (poly(vinylidene-fluoride)) fill and an electrocatalyst supported on carbon is then applied to the substrate. (*See* col. 4, lines 42-56.) Applicants recognize that the carbon particles embedded in the carbon matrix with the poly(vinylidene) fluoride may comprise more than one type of carbon. (*See* col. 7, lines 31-36.) In Cabasso, however, the carbon supporting the electrocatalyst is not mixed with a second, less corrosion resistant carbon. The carbon fill for the substrate and the carbon support for the electrocatalyst are therefore in *separate* areas of Cabasso's GDE. The carbon/PVF fill aids the conductivity and water management of Cabasso's electrode.

In the applicants' claimed structure, the first carbon component is present as a *sacrificial* carbon component, so that, during incidences of cell reversal, the first carbon component will degrade preferentially instead of, or at least to a greater degree than, the carbon support or carbon fill, if present. The present invention relates to an anode structure that comprises a standard gas diffusion layer as described in paragraph [0008] of the application. The gas diffusion layer

comprises, for example, a carbon fiber paper or woven carbon cloth and is filled with a particulate carbon. In claim 16, a mixture of two further carbon components is applied to the gas diffusion layer. In claim 25, a mixture of two further carbon components is disposed within the gas diffusion layer. The mixture of two further carbon components includes a first carbon component having substantially no resistance to corrosion and a second carbon component supporting an electrocatalyst material.

Specifically, claim 16 is novel and non-obvious over Cabasso, at least for the reason that it provides that the second carbon component *supporting the electrocatalytic material* is mixed with a first carbon component and applied to a gas diffusion layer as a coating. Cabasso discloses multiple carbon components included in a substrate, but does not disclose a first carbon component mixed with a second carbon component *that is supporting the electrocatalytic material*. This is a *structural* difference between the present claims and Cabasso, because the first carbon in Cabasso is included as a fill in a substrate structure, while in claim 16, the first carbon is mixed with the second carbon *that acts as a support for an electrocatalyst*. Therefore, the location of the first carbon structure in Cabasso differs from the location of the first carbon structure in claim 16.

Furthermore, Cabasso does not contain any teaching or suggestion which would motivate the skilled person to include a further carbon in the layer *with the electrocatalyst layer*, with the benefit that the additional carbon will corrode in preference to the carbon supporting the electrocatalytic material. In fact, Cabasso teaches away from the present invention, disclosing that having carbons that are corrosion resistant is important. (See col. 7, lines 42-44.) It would therefore not be obvious to include a carbon that has substantially no resistance to corrosion during

certain conditions in a mixture with the carbon that acts as a support for an electrocatalyst.

In addition, claim 25 is novel and non-obvious over Cabasso, at least for the reason that it provides that the carbon supporting the electrocatalytic material is embedded *within* the gas diffusion layer. To the contrary, in Cabasso, the carbon supporting to the electrocatalytic material is *applied as a coating to the gas diffusion layer*. This is also a *structural* difference between the present claims and Cabasso, because the first carbon in Cabasso is included as a fill in a substrate structure, while in claim 16, the first carbon is mixed with the second carbon *that acts as a support for an electrocatalyst* and embedded *within* the gas diffusion layer.

Furthermore, Cabasso does not contain any teaching or suggestion which would motivate the skilled person to include a further carbon in the in a mixture with the second carbon that *acts as a support to the electrocatalyst layer*, with the benefit that the additional carbon will corrode in preference to the carbon supporting the electrocatalytic material. In fact, Cabasso teaches away from the present invention, disclosing that having carbons that are corrosion resistant is important. (See col. 7, lines 42-44.) It would therefore not be obvious to include a carbon that has substantially no resistance to corrosion during certain conditions.

The present claims are all now limited to the first sacrificial carbon component being mixed with the second carbon *component that is an electrocatalyst support* and applied to the substrate (independent claim 16) or within the substrate (independent claim 25). By contrast, Cabasso nowhere mentions the problem of carbon corrosion, either of the electrocatalyst support or of the substrate fill, during cell reversal. Moreover, Cabasso nowhere discloses or

suggests that adding an extra, sacrificial carbon component, with the particular BET surface (at least  $350 \text{ m}^2\text{g}^{-1}$ ) recited each of the applicants' claims, the purpose of which is to corrode *in preference to the electrocatalyst support* and/or substrate fill.

\* \* \* \* \*

In view of the foregoing arguments and remarks, applicants submit that claims 16, 25, 29, 31, 33, and new claims 36 and 37 are allowable. The Examiner is invited to telephone the applicants' undersigned attorney at (312) 775-8000 if any unresolved matters remain.

Please charge any fees incurred in connection with this submission to Deposit Account No. 13-0017.

Respectfully submitted,

/Merle S. Elliott/

Merle S. Elliott

Registration No. 52,857

Attorney for Applicants

Robert W. Fieseler  
Registration No. 31,826  
McANDREWS, HELD & MALLOY, LTD.  
500 West Madison Street, 34th Floor  
Chicago, Illinois 60661  
Telephone (312) 775-8000  
Facsimile (312) 775-8100

Dated: September 11, 2008